

Office of Light Water Reactor Technologies Overview, NE-72

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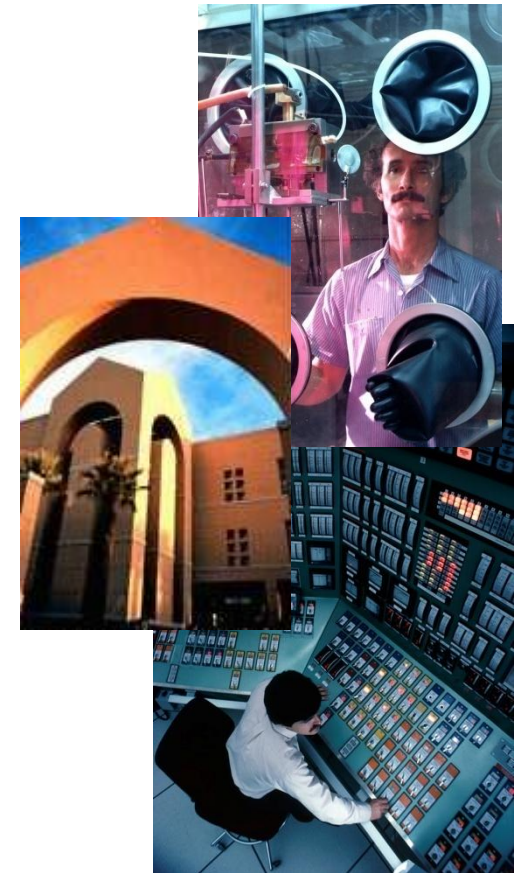
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Elements in the Light Water Reactor Technologies Office

**Office of Light Water Reactor Technologies
consists of the following program elements:**

- 1. Small Modular Reactor (SMR) Licensing
Technical Support Program**
- 2. Light Water Reactor Sustainability Program**
- 3. NEET Crosscutting Technologies**
 - Reactor Materials
 - Advanced Sensors and Instrumentation
 - Advanced Methods for Manufacturing
 - Proliferation and Terrorism Risk Assessment
- 4. National Scientific User Facility**
- 5. Post-Fukushima Support**





Budget for the Office of Light Water Reactor Technologies

	FY 2012	FY2013
	Enacted (\$ x K)	Request (\$ x K)
SMR Licensing Technical Support	67,000	65,000
Light Water Reactor Sustainability	22,000	21,661
Crosscut Research	20,642	12,446
<i>Reactor Materials</i>	9,484	6,100
<i>Advanced Sensors & Instrumentation</i>	4,525	3,053
<i>Advanced Methods for Manufacturing</i>	3,500	0
<i>Proliferation and Terrorism Risk Assessment</i>	2,000	0
<i>HQ Set Asides (SBIR, NEUP, etc.)</i>	1,133	3,293
National Scientific User Facilities	14,539	14,563
Fukushima Support	6,000 (FY11 LWRSP Funds)	TBD

SMR Licensing Technical Support Program

- **Goal is design certification and licensing of up to 2 SMR projects**
- **Supports first phase for deployment, no funding for construction**
- **Facilitates and accelerates commercial development and deployment of U.S. SMR designs at domestic locations**
- **50% Government cost share - \$452 M over 5 years**



SMR Funding Opportunity Announcement (FOA)

- **Solicit applications from teams composed of SMR vendors and utilities or consortia willing to be first movers in constructing and operating mature SMR designs**
- **Allowable scope includes site permitting, design development, certification and operating license applications and NRC review processes**
 - Applicants can use 10CFR Part 50 or 52, but requires vendor to achieve standardized design certification
- **Open to LWR and Advanced SMRs that can be deployed “expeditiously” – Target: commercial operation date of 2022**
- **Longer-term goal is promoting development of a fleet of SMRs**
 - Proposals that include broader deployment plans should be considered favorably
- **Announce selection in September 2012.**



Light Water Reactor Sustainability (LWRS) Program

- **Mission** – Develop technologies and other solutions that can improve the reliability, sustain the safety, and extend the life of current reactors.
- **Program Goals** – Conduct research to:
 - Develop fundamental scientific basis to understand and enable continued long-term operation of existing LWRs
 - Develop technical and operational improvements that contribute to long-term economic viability of existing nuclear power plants
- Supports the Department's Secretarial priorities by conducting activities focused on sustaining and expanding safe and secure nuclear energy production
- Directly supports Objective 1 of the NE R&D Roadmap by investing in R&D to develop technologies and other solutions that can improve the reliability, sustain the safety, and extend the life of current reactors

LWRSP Technical Focus Areas Summary

- Nuclear Materials Aging and Degradation
- Risk-Informed Safety Margin Characterization
- Advanced Instrumentation, Information, and Control Systems Technologies
- Advanced LWR Nuclear Fuel
- Systems Analysis and Emerging Issues
 - Water Usage issues (EPAs 316(b) rule)
 - Fukushima response such as the ongoing accident reconstruction work



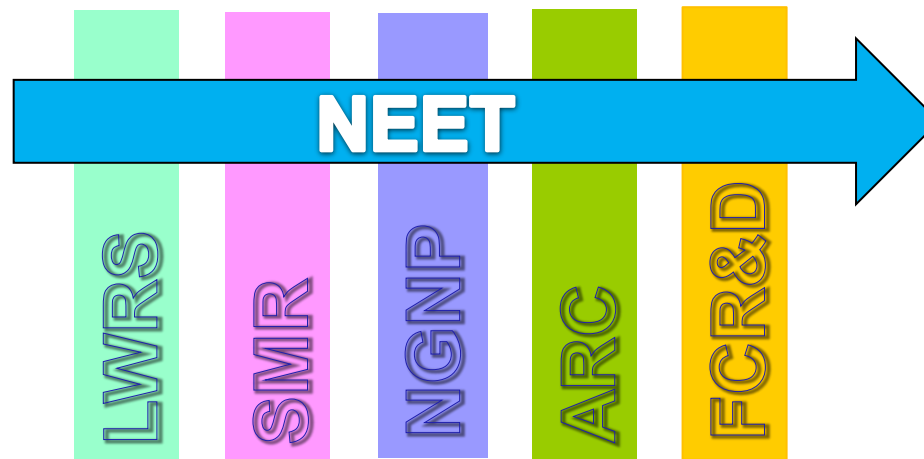


LWRSP Accomplishments

- Recently published an updated Integrated Program Plan (published in February)
- Updating the joint R&D plan with EPRI (finish in April)
- Implementing 4 I&C pilot projects at operating nuclear power plants
- Working jointly with NRC to publish the Expanded Materials Degradation Assessment (EMDA) this summer
- Fabricating and conducting test irradiations of Silicone Carbide cladding samples
- Working with the NEAMS program to have an operating version of RELAP7 this summer

NEET Crosscutting

- NEET will develop crosscutting, innovative technologies that directly support and complement the Office of Nuclear Energy's (NE) development of new and advanced reactor concepts and fuel cycle technologies
- NEET program addresses critical technology gaps relevant to multiple reactor and fuel cycle concepts in a cost-effective manner that fosters collaboration and prevents overlap



NEET Crosscutting Technologies

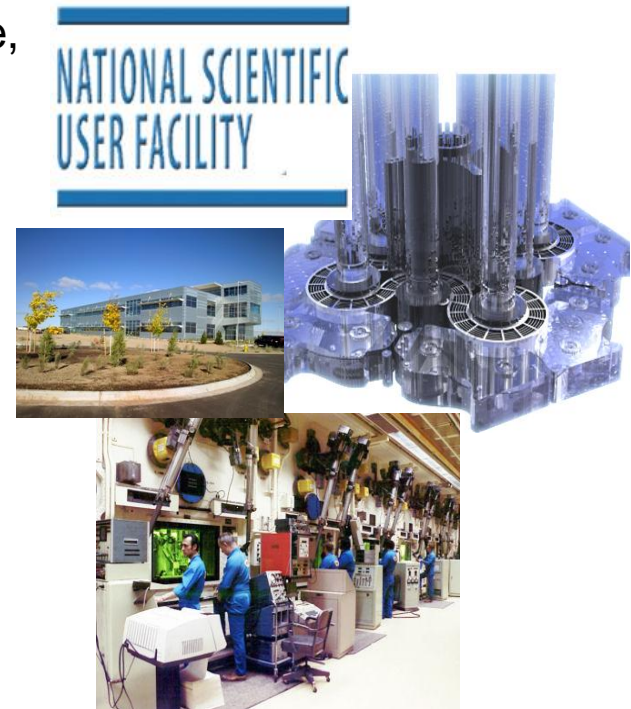
Provides support to various reactor and fuel cycle technologies:

- Reactor Materials
New classes of alloys and materials not yet considered for reactor performance may enable transformational reactor performance.
- Advanced Sensors and Instrumentation
Research on unique sensor and instrumentation infrastructure technology to monitor and control new advanced reactors and small modular reactor systems.
- Advanced Methods for Manufacturing
Research on advanced manufacturing technologies that draw upon successful practices in oil, aircraft, and shipbuilding industries, as appropriate, and employ modeling and simulation capabilities.
- Proliferation and Terrorism Risk Assessment
Develop new tools and approaches for understanding, limiting, and managing risks of proliferation and physical security for fuel cycle and reactor system options.



National Scientific User Facility

- **Unique nuclear research facilities available for science-based experiments**
 - Mechanism for research organizations to collaborate, and conduct experiments and post-experiment analysis at facilities not normally accessible.
- **Researchers introduced to new techniques, equipment, and personnel**
- **User Facilities:**
 - INL's Advanced Test Reactor and post-irradiation examination facilities of the Material and Fuels Complex, as well as INL's CAES facility
 - Research reactors at the Oak Ridge National Laboratory, the Massachusetts Institute of Technology and North Carolina State University
 - Examination facilities at the Universities of Wisconsin, Michigan, California-Berkeley and Nevada-Las Vegas



Post-Fukushima Accident Support

- **Evolved from the immediate NE Response Team that was called upon to provide support to the Government of Japan during the immediate Fukushima crisis.**
- **Follow and support, as requested, DOE's Fukushima related activities.**
- **Interface with the Japanese Government and commercial organizations on Fukushima-related issues.**
 - Support requests for assistance, where determined to be technically reasonable and appropriate for a Government Response
 - Explore where our National Laboratories can support site decommissioning activities, on a cost-reimbursable basis
- **Conducting, jointly with NRC, a computer reconstruction of the accident using Sandia's MELCOR Severe Accident Analysis code**
 - MELCOR is the primary system-level code used by NRC to analyze reactor severe accident behavior and consequences.
 - Will allow assessment of our severe accident modeling capability and the MELCOR code